Who is afraid of political risk? Multinational firms and their choice of capital structure

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Abstract

This paper investigates how multinational firms choose the capital structure of their foreign affiliates in response to political risk. We focus on two choice variables, the leverage and the ownership structure of the foreign affiliate, and we distinguish different types of political risk, such as expropriation, unreliable intellectual property rights and confiscatory taxation. In our theoretical analysis we find that, as political risk increases, the ownership share tends to decrease, whereas leverage can both increase or decrease, depending on the type of political risk. Using the Microdatabase Direct Investment of the Deutsche Bundesbank, we find supportive evidence for these different effects.

Keywords: Multinational firms, political risk, capital structure, leverage, ownership structure, foreign affiliates
JEL: F23, F21, G32

Non technical summary

Multinational enterprises (MNE) have to adapt their optimal investment strategy to local conditions worldwide. Most notably, they have to respond to different political environments that in different locations may give rise to varying political risks. In this paper we investigate, both theoretically and empirically, the way MNE choose their capital structure in response to political risk. For this purpose, we distinguish different types of political risk. We find that it is important to identify the type that prevails in a particular country, because different types of risk affect the optimal financing decision in different ways.

We focus on two choice variables that determine the capital structure - the level of leverage and the ownership structure of the foreign affiliate. Choosing higher leverage reduces tax payments but increases the risk of bankruptcy, involving some bankruptcy cost. The investor balances optimally these costs and benefits of debt financing. Furthermore, he chooses how much of the affiliate to sell to outside investors, taking into account how the ownership structure affects the agency costs and the value of the affiliate.

We distinguish three prototypes of political risk throughout the paper, ranging from outright expropriation to creeping expropriation like unreliable intellectual property rights and confiscatory taxation.

Our analysis shows that these different forms of political risk affect equity holders and debt holders in different ways and can therefore result in the multinational choosing different capital structures. In our theoretical analysis we find that, as political risk increases, the ownership share tends to decrease. In contrast, leverage can both increase or decrease, depending on the type of political risk, with the negative sign more likely to be prevailing the more severe the type of political risk.

In our empirical analysis, we use the Microdatabase Direct Investment (MiDi) of the Deutsche Bundesbank to investigate the impact of political risk on both the choice of ownership shares and the choice of leverage of foreign affiliates of German multinationals.

We estimate the impact of political risk on our two choice variables, ownership share and leverage. Using the risk measure of the International Country Risk Guide and allowing the marginal effect of political risk to vary with the severity of political risk, we find that indeed leverage first increases and then decreases in political risk. For ownership, it is comparatively more likely that the ownership share decreases with political risk.

We then employ various empirical measures, reflecting different types of political risk, and identify them with different scenarios. Following this strategy we can confirm that the ownership share decreases in political risk no matter what type of measure we introduce, while leverage can either increase or decrease in response to different types of risk.

Nicht technische Zusammenfassung

Multinationale Unternehmen (MNU) müssen ihre optimale Investitionsstrategie weltweit den lokalen Rahmenbedingungen anpassen. Insbesondere müssen sie auf die politischen Rahmenbedingungen am Investitionsstandort reagieren, die wiederum das politische Risiko bestimmen. In der vorliegenden Studie untersuchen wir sowohl theoretisch als auch empirisch, wie MNU ihre Kapitalstruktur in Reaktion auf das politische Risiko wählen. Dazu unterscheiden wir unterschiedliche Arten von politischem Risiko. Unsere Analyse zeigt, dass es wichtig ist, die Art des politischen Risikos zu bestimmen, da die optimale Finanzierungsentscheidung von der Art des politischen Risikos abhängt.

Wir betrachten zwei Entscheidungsgrößen, durch die die Kapitalstruktur bestimmt wird: der Verschuldungsgrad und die Beteiligungsstruktur der Auslandstochter. Ein höherer Verschuldungsgrad reduziert die Steuerlast, erhöht aber das Risiko eines Konkurses, bei dem Konkurskosten entstehen. Der Investor wählt den optimalen Verschuldungsgrad in Abhängigkeit von Kosten und Nutzen des Fremdkapitals. Darüber hinaus entscheidet der Investor über den Anteil am Eigenkapital der Auslandtochter, der an externe Investoren verkauft werden soll. Bei dieser Entscheidung berücksichtigt er, wie sich die Beteiligungsstruktur auf den Wert der Auslandstochter auswirkt.

In unserer Analyse unterscheiden wir drei Prototypen des politischen Risikos, die von direkter Enteignung über schleichende Enteignung bis zum unzureichenden Schutz intellektuellen Eigentums und konfiskatorischer Besteuerung reichen.Unsere Analyse zeigt, daß Eigen- und Fremdkapitalgeber unterschiedlich durch die verschiedenen Typen des politischen Risikos betroffen werden, was wiederum zu Unterschieden in der Kapitalstrukturwahl des MNU führt. Unsere theoretische Analyse sagt vorher, dass der Anteil am Eigenkapital der Tochter, den das Mutterunternehmen hält, mit dem politischen Risiko sinkt, und dies unabhängig von der Art des politischen Risikos. Im Gegensatz dazu kann der Verschuldungsgrad der Auslandstochter je nach Art des politischen Risikos sowohl sinken als auch steigen, wobei bei hohem politischen Risiko eher ein Absinken zu erwarten ist und umgekehrt.

In unserer empirischen Analyse untersuchen wir den Einfluss von politischem Risiko sowohl auf die Beteiligungsstruktur als auch den Verschuldungsgrad der Auslandstöchter von deutschen MNU mit der Mikrodatenbank Direktinvestitionen der Deutschen Bundesbank.Als Maß für politisches Risiko betrachten wir den Risikoindex des International Country Risk Guide. Wenn wir eine Variation des marginalen Effekts des politischen Risikos mit der Stärke des politischen Risikos zulassen, dann beobachten wir bei ansteigendem politischen Risiko tatsächlich erst einen Anstieg und dann ein Absinken des Verschuldungsgrades. Im Gegensatz dazu finden wir, dass ein Sinken des Eigenkapitalanteils der Mutter mit steigendem politischen Risiko vergleichsweise wahrscheinlicher wird.

Eine weitere Möglichkeit, verschiedene Arten von politischem Risiko zuzulassen, besteht darin, mehrere empirische Maße zu verwenden, die verschiedene Facetten des politischen Risikos abbilden. Auch auf diesem Weg finden wir, dass der Eigenkapitalanteil der Mutter im politischen Risiko sinkt, unabhängig davon, welches empirische Maß wir verwenden, während die Reaktion des Verschuldungsgrades von der Art des politischen Risikos abhängt.

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1 Introduction

Multinational enterprises (MNE) have to adapt their optimal investment strategy to local conditions worldwide. Most notably, they have to respond to different political environments that in different locations may give rise to varying political risks. Political risk encompasses not only 'sovereign risk', the risk that the sovereign will interfere with a firm's ability to pay its investors as promised, but also other forms of political, economic and country-specific risks that affect the profitability of an investment in a foreign country and that would not be present if the country had more stable and developed business environment and legal institutions (Hill (1998) and Buckley (1992)). This risk ranges from outright expropriation to more subtle forms like confiscatory taxation, corruption, or economic constraints such as exchange rate controls. MNE can try to insure against political risk, but they can never do so fully.[2]

In this paper we investigate, both theoretically and empirically, the way MNE choose their capital structure in response to political risk. For this purpose, we distinguish different types of political risk. We find that it is important to identify the type that prevails in a particular country, because different types of risk affect the optimal financing decision in different ways.

We focus on two choice variables that determine the capital structure - the level of

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[2]First, the insurance market for political risk is incomplete because most types of political risk are not contractible and because the market suffers from severe asymmetric information (see for example Desai, Foley, and Hines Jr. (2006)). Second, many investors are unaware of the existence of political risk insurance and even those who are aware of its existence often do not have such insurance (www.political-risk.net).

leverage and the ownership structure of the foreign affiliate. Choosing higher leverage reduces tax payments but increases the risk of bankruptcy, involving some bankruptcy cost. The investor balances optimally these costs and benefits of debt financing. Furthermore, he chooses how much of the affiliate to sell to outside investors, taking into account how the ownership structure affects the agency costs and the value of the affiliate.

We distinguish three prototypes of political risk throughout the paper.[3] In Scenario I, political risk takes the form of outright expropriation or nationalization, where the investor loses all assets and can no longer service his credits. In the past, this type of political risk used to be very important (Kobrin (1980), Andersson (1991)). Though in general it seems to be less prevalent nowadays there are very recent examples indicating its latent relevance.[4]

Scenario II captures political risk as a form of creeping expropriation that lowers the expected returns of the project. Examples could be lack of protection for intellectual property rights or unreliable contract enforcement, but could also be economic constraints like currency or exchange rate controls, or particular regulatory requirements directed at foreign multinationals. Political violence that negatively affects market conditions and hence expected revenues would be another example.

In Scenario III, we capture political risk that directly affects the profits of the investment, i.e., after servicing potential debt payments. This type of political risk arises if the host country imposes discriminatory and confiscatory taxation, asks for bribes or blocks the repatriation of funds from the host country to the home country.

Our analysis shows that these different forms of political risk affect equity holders and debt holders in different ways and can therefore result in the multinational choosing different capital structures. We find that the optimal debt level decreases with increasing political risk in both Scenarios I and II because (creeping) expropriation increases the risk of bankruptcy, which calls for smaller leverage. But the optimal debt level increases with political risk in Scenario III because the negative effects of discriminatory or confiscatory

[3]For a description of various forms of political risks see Buckley (1992), Hill (1998).

[4]Recent examples where expropriations have taken place are Zimbabwe and Venezuela. In 2007, a law was adopted in Zimbabwe that forces foreign investors to find a majority Zimbabwean shareholder within five to ten years (compare for example dpa and netzeitung.de (27/09/2007) or VOANews, AFP, and Reuters (11/03/2008)). In 2008, both Cemex, a Mexican cement company, and Sidor, Venezuela's biggest producer of steel, were expropriated by the Venezuelan government without paying appropriate compensation (compare for example AP (01/05/2008), Romero (18/05/2008), or Ackerman (19/09/2008)).

taxation can be contained with higher leverage. Furthermore, we find that, in all three scenarios, the optimal ownership share tends to decrease as the level of political risk increases because political risk reduces the investor's expected returns from the foreign affiliate, but does not reduce the managerial cost of running the firm. Interestingly, though, due to the interaction with the optimal debt choice, the ownership share reduction is less pronounced in case of confiscatory taxation, where the debt level increases, as compared to the case of (creeping) expropriation, where the debt level is reduced as a response to political risk.

In our empirical analysis, we use the Microdatabase Direct Investment (MiDi) of the Deutsche Bundesbank to investigate the impact of political risk on both the choice of ownership shares and the leverage of foreign affiliates of German multinationals. The dataset contains balance sheet information on the foreign affiliates. German parent companies are required by law to report this information when the balance sheet total of the affiliate and the ownership share are larger than a certain threshold. As a measure for political risk, we use the time-varying, country-specific index that is provided by the International Country Risk Guide (ICRG) and that is composed of 12 weighted variables covering both political and social attributes.

We estimate the impact of political risk on our two choice variables, ownership share and leverage. We start by looking at the linear effects of political risk. Our ownership regression indicates that MNEs hold a smaller share of the equity of the foreign affiliate when political risk is high, confirming our theoretical predictions. Regarding the leverage choice, we find that affiliates of MNE use a higher level of debt in countries with a higher level of political risk. This would suggest the prevalence of the less invasive Scenario III type of political risk.

We then attempt to capture the theoretical insight that the effects of political risk may differ for different scenarios of political risk. For this purpose we follow two different strategies. One strategy is to employ various empirical measures, reflecting different types of political risk, and to identify them with different scenarios. Following this strategy of using different measures we can confirm that the ownership share decreases in political risk no matter what type of measure we introduce, while leverage can either increase or decrease in response to different types of risk. The second strategy is to rank the scenarios according to their severity and to introduce a quadratic function of political risk which allows the marginal effects of political risk to vary with the severity of political risk. Following this

approach, we find that indeed leverage first increases and then decreases in political risk. For ownership, it is comparatively more likely that the ownership share decreases with political risk.

Our paper is related to two strands of literature, the literature on political risk and the literature on the capital structure choice.

The first strand studies the effects of political risk on foreign direct investment. The early theoretical papers were primarily concerned with the question of how foreign direct investment can be sustained if there is a risk of nationalization. The seminal paper in this literature is Eaton and Gersovitz (1983), which shows under what circumstances reputation can sustain foreign direct investment. Other papers study how political risk affects the multinational's investment strategy. This may induce the investor to choose an inefficient technology (Eaton (1995)), inefficient investment paths (Thomas and Worrall (1994), and Schnitzer (1999)) or excess capacity (Janeba (2000)). More recent papers have investigated the sale of shares to locals as a possible way of mitigating the risk of confiscatory taxation or creeping expropriation (Konrad and Lommerud (2001), Mueller and Schnitzer (2006)). However, none of these authors have allowed for different forms of political risk that impact on the investor's decisions in different ways. Empirical studies have focussed on the question of how country characteristics affect the ownership structure in foreign direct investment projects (Asiedu and Esfahani (2001)).

The second strand of literature has so far mainly focused on taxes as the driving force behind the capital structure choice. It has been shown both empirically and theoretically that tax incentives lead to national differences in the level of leverage of affiliates of MNE (see for example Desai, Foley, and Hines (2004), Huizinga, Laeven, and Nicodeme (2006), Buettner, Overesch, Schreiber, and Wamser (2006) and Mintz and Weichenrieder (2005)). However, there is much less evidence on how differing levels of political risk may affect the capital structure of affiliates that are located in different countries. For US-data, Desai, Foley and Hines (2004) find that political risk increases affiliate leverage. Aggarwal and Kyaw (2004) also use US data, but on a more aggregated level. In contrast to Desai, Foley and Hines, they find that political risk reduces affiliate leverage. Novaes and Werlang (2005) study foreign affiliates in Brazil and find that they are more highly leveraged than their Brazilian counterparts and that the difference increases with Brazil's political risk. This conflicting evidence suggests that the relationship between political risk and leverage is not

straightforward and hence needs more examination.

The contribution of our paper is twofold. Firstly, it provides a theoretical framework that explicitly models the choice of the capital structure in response to political risk. It is also the first paper to distinguish in a theoretical framework different kinds of political risk. Secondly, our paper contributes to the empirical literature on political risk by investigating the impact of political risk on both leverage and ownership choices, and by distinguishing the impact of different types and magnitudes of political risk. As our theoretical analysis suggests, the coefficient measuring the impact of political risk on leverage may indeed change signs, depending on the type of political risk. We find this possibility of different coefficients confirmed in our empirical analysis.

The remainder of the paper is organized as follows. Section 2 introduces our theoretical model and analyzes the optimal financial structure in the baseline model. Section 3 introduces different types of political risk and investigates the optimal financial structure in the presence of political risk. In section 4, we derive empirical predictions. Section 5 introduces the data set. In Section 6 we present our empirical results. Section 7 concludes.

2 The base line model

Consider a multinational investor who intends to invest a fixed amount I in a foreign location. The project generates a stochastic return R, with R being uniformly distributed on the interval $[0, \bar{R}]$. The investment can be financed with either debt, D, or equity, E, or a combination of the two, such that $E + D = I$.

The investor has to take two decisions, he has to choose (i) how much debt finance D to use as opposed to equity finance and (ii) what share α of the affiliate to keep for himself, i.e., what share $(1 - \alpha)$ of the affiliate to sell to outside investors. In the corporate finance literature, these decisions have always been studied separately. Thus, to jointly investigate both decisions, we set up a model that draws on both strands of the corporate finance literature, the one on the debt versus equity decision and the one on the optimal ownership share.

Leverage choice

To model the debt versus equity choice, we consider the well established tradeoff that debt

financing allows to save on tax payments but increases the probability of bankruptcy, giving rise to potential dead weight losses.[5] To capture this tradeoff, we assume that in case of debt financing D the investor's liability is restricted to the investment project. So if the investor takes up debt D, he has to repay $(1+r)D$, where r denotes the interest rate. He can do so only when the project is sufficiently successful, i.e., generates returns $R \geq (1+r)D$. The remaining profits, after interest payments have been deducted, are subject to local taxation, at interest rate t. If the returns are not sufficient to cover the repayment, the project is liquidated and the investor has to give up all the returns to the bank. The affiliate's value V for a given level of D is thus

$$V = \int_{(1+r)D}^{\bar{R}} (1-t)[R-(1+r)D]\frac{1}{\bar{R}}dR + D - I \tag{1}$$

Banks are assumed to operate in a competitive market and to be risk neutral. This means that, for any level of debt that the investor wants the bank to finance, the interest rate r is chosen such that the bank can expect to break even. We assume that in case of bankruptcy transaction costs are incurred during the bankruptcy procedure such that the bank is able to seize only some share s of the returns that are generated, with $s < 1$. This assumption is supposed to capture the dead weight loss that is associated with debt financing due to the risk of bankruptcy. The interest rate is implicitly defined by the bank's break even condition

$$\int_{(1+r)D}^{\bar{R}} (1+r)D\frac{1}{\bar{R}}dR + \int_{0}^{(1+r)D} sR\frac{1}{\bar{R}}dR = D \tag{2}$$

where the first integral represents the expected interest payments and the second integral represents the expected payoff the bank realizes in case of bankruptcy.

Ownership choice

Consider now the ownership choice of the investor, i.e. what share $(1-\alpha)$ of the foreign affiliate to sell to outside investors. If financial markets are competitive and perfect, i.e. with no transaction costs and risk neutrality, then the assets will be valued by outside investors at their expected value. So the price the investor realizes for selling a share of

[5] In the corporate finance literature, this tradeoff is often called the tradeoff between interest tax shields and the costs of financial distress. See, e.g., Brealey and Myers (1996), pp. 496ff. Seminal papers on this issue are Kraus and Litzenberger (1973), and Scott (1976).

$(1-\alpha)$ of the affiliate, $P((1-\alpha)V)$, is equal to $(1-\alpha)V$.[6] We will discuss below how things change if markets are not perfect, in particular if the exposure of outside investors to political risk differs from that of insiders.

To model the ownership decision, we draw again on the corporate finance literature. In this literature, two potential effects are discussed why (and how) the ownership choice may affect the firm's value. The convergence-of-interest hypothesis predicts that larger ownership stakes are associated with higher firm values, because they allow for a better alignment of the incentives of owner and manager or inside and outside investors.[7] The entrenchment hypothesis, on the other hand, suggests that insiders who control a substantial part of the shares may indulge in non-value maximizing behavior at the cost of outside investors.[8] Empirical studies on this issue suggest that the firm value as a function of the insider's ownership share α follows an inverted u-shaped pattern. This evidence has been interpreted such that the convergence-of-interest effect dominates for low and the entrenchment effect for large values of α.[9]

Following the convergence-of-interest hypothesis we assume that the investor increases his effort as α increases, at cost $K(\alpha)$, with $K'(\alpha) > 0$ and $K''(\alpha) > 0$, as larger ownership stakes imply more effort to be spent on the firm. Following the entrenchment hypothesis, we assume that the investor enjoys private benefits $B(\alpha)$ that increase in α, i.e. $B'(\alpha) > 0$, but at a decreasing rate, i.e. $B''(\alpha) < 0$. The combination of effort and entrenchment effects are reflected in the revenues of the affiliate that can be appropriated by the investors in the following way: $\bar{R}$ is an inverted u-shaped function of α, with $\bar{R}'(\alpha) > 0$ for $\alpha = 0$, $\bar{R}''(\alpha) < 0$ and $\bar{R}'(\hat{\alpha}) = 0$ for $0 < \hat{\alpha} < 1$.

The investor's payoff function from holding equity share α, selling equity share $(1-\alpha)$ and experiencing private benefits and costs can thus be summarized as follows:

$$U(D,\alpha) = \alpha V(D,\alpha) + P[(1-\alpha)V(D,\alpha)] + B(\alpha) - K(\alpha) = V(D,\alpha) + B(\alpha) - K(\alpha) \quad (3)$$

The investor chooses both the optimal debt level D and the optimal ownership share α in order to maximize his payoff function.

[6] See, for example, Ross (1977).

[7] Berle and Means (1932), Jensen and Meckling (1976).

[8] Demsetz (1983), Fama and Jensen (1983).

[9] See, e.g., Morck, Shleifer, and Vishny (1988), McConnell and Servaes (1990) and Short and Keasey (1999).

The optimal financial structure

We now turn to solving the base line model without political risk. For this, consider again the investor's payoff function, which, using the specification of the firm value in equation (1), is

$$\begin{aligned} U(D,\alpha) &= V(D,\alpha) + B(\alpha) - K(\alpha) && (4)\\ &= \int_{(1+r)D}^{\bar{R}(\alpha)} (1-t)[R-(1+r)D]\frac{1}{\bar{R}(\alpha)}dR + D - I + B(\alpha) - K(\alpha) && (5)\\ &= \frac{1-t}{\bar{R}(\alpha)}\left[\frac{1}{2}\bar{R}^2(\alpha) - (1+r)D\bar{R}(\alpha) + \frac{1}{2}(1+r)^2D^2\right] + D - I + B(\alpha) - K(\alpha) \end{aligned}$$

Using equation (2) we can rewrite the payoff function in the following way (see Appendix)

$$U(D,\alpha) = (1-t)\left[\frac{1}{2}\bar{R}(\alpha) - \frac{(1-s)(1+r)}{2-s}D\right] + \frac{1-s+t}{2-s}D - I + B(\alpha) - K(\alpha)\ . \quad (6)$$

The investor's maximization problem is characterized by the following two first order conditions.

$$\begin{aligned} \frac{dU}{d\alpha} &= (1-t)\left[\frac{1}{2}\frac{d\bar{R}}{d\alpha} - \frac{1-s}{2-s}D\frac{dr}{d\bar{R}}\frac{d\bar{R}}{d\alpha}\right] + B' - K' = 0 && (7)\\ \frac{dU}{dD} &= -(1-t)\frac{1-s}{2-s}\left[(1+r) + \frac{dr}{dD}D\right] + \frac{1-s+t}{2-s} = 0 && (8) \end{aligned}$$

The following result summarizes the solution to this maximization problem:

Result 1 *The investor's maximum payoff is*

$$U^*(D^*,\alpha^*) = \frac{\bar{R}(\alpha^*)}{2}\frac{1-s+st}{1-s+t} - I + B(\alpha^*) - K(\alpha^*) \quad (9)$$

where α^* is implicitly defined by

$$\left[\frac{1-s+st}{1-s+t}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha} + B' - K' = 0 \quad (10)$$

and D^* is given by

$$D^* = \frac{\bar{R}}{2}t\frac{2(1-s)+st}{(1-s+t)^2} \quad (11)$$

Proof: See Appendix

The following result summarizes the comparative statics with respect to the local taxation rate t.

Result 2 *The optimal debt level D^* increases as the local tax rate t increases.*

$$\frac{dD^*}{dt} = \frac{\bar{R}(1-s)^2}{(1-s+t)^3} > 0 \tag{12}$$

The optimal ownership share α^* decreases as t increases, if $\bar{R}' > 0$ in the relevant parameter range, i.e.

$$\frac{d\alpha^*}{dt} = \frac{\left[\frac{(1-s)^2}{(1-s+t)^2}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha}}{\left[\frac{1-s+st}{1-s+t}\right]\frac{1}{2}\frac{d^2\bar{R}}{d\alpha^2} + B'' - K''} < 0 \quad if \quad \bar{R}' > 0. \tag{13}$$

Proof: See Appendix

Result 2 shows the expected pattern for the optimal debt level: as the tax rate increases, the debt level increases. It is also straightforward to show that $\frac{dD^*}{ds} > 0$, i.e. as the inefficiency of bankruptcy decreases, the optimal debt level increases. This captures the well established tradeoff of debt versus equity financing. For the ownership share, we find that α decreases if $\bar{R}' > 0$ in the relevant parameter range, which, as equation 10 shows, is the case if $B' < K'$, i.e. unless the entrenchment benefits are particularly large.

3 Political risk and the optimal financial structure

Consider now that the investment project is subject to political risk in the foreign location. To study how this affects the firm's financial structure, we distinguish different forms of political risk.

(1) Expropriation

The first type of political risk we consider is expropriation or nationalization. This is the classic form of political risk where a sovereign simply takes property without compensation (Buckley (1992), Hill (1998)). We capture this form of political risk by assuming that the investment is expropriated with some probability π_1, i.e. the investors lose control and cash flow rights from the investment. This leads to the following modified firm value function.

$$V_1 = (1-\pi_1)\int_{(1+r)D}^{\bar{R}} (1-t)[R-(1+r)D]\frac{1}{\bar{R}}dR + D - I \tag{14}$$

Credits are serviced only if the investment is not expropriated. So the zero profit condition for banks needs to be modified. This is captured by the following condition.

$$(1-\pi_1)\left[\int_{(1+r)D}^{\bar{R}}(1+r)D\frac{1}{\bar{R}}dR+\int_0^{(1+r)D}sR\frac{1}{\bar{R}}dR\right]=D \tag{15}$$

Of course, if the investment is expropriated, the investor also loses his benefits from potential entrenchment, $B(\alpha)$. His managerial effort cost of running the firm are incurred before the potential expropriation takes place and hence are not affected. Thus, the investor's payoff function is now

$$U_1(D,\alpha,\pi_1)=(1-\pi_1)\int_{(1+r)D}^{\bar{R}}(1-t)[R-(1+r)D]\frac{1}{\bar{R}}dR+D-I+(1-\pi_1)B(\alpha)-K(\alpha) \tag{16}$$

This payoff function implicitly assumes that outside investors, no matter where they are located, are affected by the danger of expropriation in exactly the same way as the multinational investor. Of course, there may be circumstances where they are better protected against expropriation, e.g. because they are local investors and the government compensates them for their losses. In this case their perceived value of the affiliate is not as negatively affected as the multinational investor's perceived value. We will discuss below how this affects our results.

(2) Creeping Expropriation

Another form of political risk we consider is creeping expropriation or political violence that negatively affects the expected returns of the investment project. Other examples would be currency or exchange rate restrictions, or a failure to enforce or respect the agreed property and contract rights (Buckley (1992), Hill (1998)). We capture this by assuming that the investor can capture only a share $(1-\pi_2)$ of the returns R. This leads to the following modified firm value function.

$$V_2=\int_{\frac{(1+r)D}{1-\pi_2}}^{\bar{R}}(1-t)[(1-\pi_2)R-(1+r)D]\frac{1}{\bar{R}}dR+D-I \tag{17}$$

The expected returns of the investment project also affect the zero profit condition for banks that needs to be modified in the following way.

$$\int_{\frac{(1+r)D}{(1-\pi_2)}}^{\bar{R}}(1+r)D\frac{1}{\bar{R}}dR+\int_0^{\frac{(1+r)D}{(1-\pi_2)}}s(1-\pi_2)R\frac{1}{\bar{R}}dR=D \tag{18}$$

As above, also creeping expropriation jeopardizes the investor's chances of enjoying benefits from entrenchment but leaves managerial effort cost unaffected. Thus, the investor's payoff function is now

$$U_2(D,\alpha,\pi_2)=\int_{\frac{(1+r)D}{(1-\pi_2)}}^{\bar{R}}(1-t)[(1-\pi_2)R-(1+r)D]\frac{1}{\bar{R}}dR+D-I+(1-\pi_2)B(\alpha)-K(\alpha) \tag{19}$$

We now investigate how political risk affects the optimal financial structure. The following result describes how the investor chooses the optimal ownership share and the optimal debt level in the presence of (creeping) expropriation.

Result 3 *The investor's maximum payoff in case of (creeping) expropriation is*

$$U^*_{1/2}(D^*_{1/2},\alpha^*_{1/2})=(1-\pi_{1/2})\frac{\bar{R}(\alpha^*)}{2}\frac{1-s+st}{1-s+t}-I+(1-\pi_{1/2})B(\alpha^*)-K(\alpha^*) \tag{20}$$

where $\alpha^*_{1/2}$ *is implicitly defined by*

$$(1-\pi_{1/2})\left[\frac{1-s+st}{1-s+t}\frac{1}{2}\frac{d\bar{R}}{d\alpha}+B'\right]-K'=0 \tag{21}$$

and $D^*_{1/2}$ *is given by*

$$D^*_{1/2}=(1-\pi_{1/2})\frac{\bar{R}}{2}t\frac{2(1-s)+st}{(1-s+t)^2} \tag{22}$$

Proof: See Appendix

We now determine the comparative statics with respect to the political risk parameter $\pi_{1/2}$.

Result 4 *Both the optimal debt level and the optimal ownership share decrease as (creeping) expropriation increases*

$$\frac{dD^*_{1/2}}{d\pi_{1/2}} = -\frac{\bar{R}}{2}t\frac{(2(1-s)+st)}{(1-s+t)^2}<0 \tag{23}$$

$$\frac{d\alpha^*_{1/2}}{d\pi_{1/2}} = \frac{\frac{(1-s+st)}{(1-s+t)}\frac{1}{2}\frac{d\bar{R}}{d\alpha}+B'}{(1-\pi_{1/2})\left[\frac{1-s+st}{(1-s+t)}\frac{1}{2}\frac{d^2\bar{R}}{d\alpha^2}+B''\right]-K''}<0 \tag{24}$$

Proof: See Appendix

Interestingly, we find that both types of political risk, expropriation and creeping expropriation, affect the financial structure and the investor's payoff in the same way. For a given debt level, the risk of expropriation makes it less likely that interest payments are made. This has to be compensated by a higher interest rate, which in turn increases the risk of bankruptcy. As a consequence, the investor chooses a smaller debt level. In case of creeping expropriation, overall revenues are smaller, increasing the likelihood of bankruptcy for any given level of debt. This leads to the same reduction of the optimal debt level.

With the same debt level, the overall payoff of the investor is the same, for any given ownership share. (Creeping) expropriation reduces the monetary and non-monetary payoff from the investment but does not change the managerial effort cost of running the firm. Thus, the investor optimally lowers his ownership share. This effect would be even larger if outside investors were less exposed to political risk and hence would value the foreign affiliate more highly.[10]

Desai, Foley, and Hines Jr. (2006), who find empirically that debt is higher in high political risk countries, have argued that credits taken by local creditors may not react as much to political risk because local creditors may be more restricted in their choice of investment opportunities. The empirical evidence does, however, suggest that local interest rates react positively to political risk (Desai, Foley, and Hines (2004), Aggarwal and Kyaw (2004)).

(3) (Confiscatory taxation)

Our third scenario captures the type of political risk that directly affects the multinational's profits. Examples would be the blocking of the repatriation of funds from the host country to the home country, or corruption and discriminatory and confiscatory taxation that treats foreign firms differently from domestic firms (Buckley (1992)). We model this as a form of profit tax, i.e., interest payments can be deducted and are not subject to taxation or bribes. This scenario is particularly relevant if credits are obtained locally and hence the local government has no interest in jeopardizing the repayment of local credits.

[10]This effect will also be larger if the allocation of ownership rights can be used as a means of influencing the likelihood of nationalization. As Konrad and Lommerud (2001) and Schnitzer (2002) have shown, it could be in the interest of the investor to share ownership with host country firms, even without compensation, if this makes the host country less prone to engage in expropriation or confiscatory taxation.

The affiliate's value is thus given by

$$V_3 = \int_{(1+r)D}^{\bar{R}} (1 - t - \pi_3)[R - (1+r)D] \frac{1}{\bar{R}} dR + D - I \tag{25}$$

This type of political risk has no impact on the zero profit condition for banks, provided that the government indeed exempts the interest payments from discriminatory taxation.

Thus the break even condition for the bank is the same as in the baseline model

$$\int_{(1+r)D}^{\bar{R}} (1+r)D \frac{1}{\bar{R}} dR + \int_{0}^{(1+r)D} sR \frac{1}{\bar{R}} dR = D \ . \tag{26}$$

As this type of political risk applies to profits rather then revenues, the private benefits of the investor, $B(\alpha)$, are not likely to be affected, nor is the managerial effort cost, $K(\alpha)$. This implies the following payoff function:

$$U_3(D, \alpha, \pi_3) \quad = \quad \int_{(1+r)D}^{\bar{R}} (1 - t - \pi_3)[R - (1+r)D] \frac{1}{\bar{R}} dR + D - I + B(\alpha) - K(\alpha) \tag{27}$$

The following result describes how the investor chooses the optimal ownership share and the optimal debt level as a function of political risk.

Result 5 *The investor's maximum payoff is*

$$U_3^*(D_3^*, \alpha_3^*) = \frac{\bar{R}(\alpha_3^*)}{2} \frac{1 - s + s(t + \pi_3)}{1 - s + (t + \pi_3)} - I + B(\alpha_3^*) - K(\alpha_3^*) \tag{28}$$

where α_3^* *is implicitly defined by*

$$\left[\frac{1 - s + s(t + \pi_3)}{(1 - s + t + \pi_3)} \right] \frac{1}{2} \frac{d\bar{R}}{d\alpha} + B' - K' = 0 \tag{29}$$

and D_3^* *is given by*

$$D_3^* = \frac{\bar{R}}{2}(t + \pi_3) \frac{2(1 - s) + s(t + \pi_3)}{(1 - s + (t + \pi_3))^2} \tag{30}$$

Proof: See Appendix

We can now determine the comparative statics with respect to political risk π_3.

Result 6 *The optimal debt level increases as confiscatory taxation increases.*

$$\frac{dD_3^*}{d\pi_3} = \frac{\bar{R}(1-s)^2}{(1-s+t+\pi_3)^3} > 0 \tag{31}$$

The optimal ownership share α_3^* *decreases if* $\bar{R}' > 0$ *in the relevant parameter range, i.e.*

$$\frac{d\alpha_3^*}{d\pi_3} = \frac{\left[\frac{(1-s)^2}{(1-s+t+\pi_3)^2}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha}}{\left[\frac{1-s+s(t+\pi_3)}{1-s+t+\pi_3}\right]\frac{1}{2}\frac{d^2\bar{R}}{d\alpha^2} + B'' - K''} < 0 \quad if \quad \bar{R}' > 0 \tag{32}$$

Proof: See Appendix

In contrast to the case of (creeping) expropriation, confiscatory taxation does not increase the likelihood of bankruptcy, but instead induces the investor to choose a higher debt level to avoid this drain on profits. As pointed out above, this strategy is particularly worthwhile if debt holders are not negatively affected and hence do not have to increase interest rates. The optimal ownership share is likely to decrease as confiscatory taxation increases, provided $\bar{R}' > 0$, which, according to the first order condition that implicitly defines α_3^*, is the case if $B'(\alpha_3^*) < K'(\alpha_3^*)$.

We can summarize the findings from our theoretical analysis as follows:

For the optimal debt level, we find that the effects depend on the type of political risk. In scenario (1) and (2) the effects were negative. Only in scenario (3) did we find a positive effect of political risk on the optimal debt level. The effect of political risk on ownership share tends to be negative in all three scenarios. Only in scenario (3) could it be positive, and only if the benefits from the entrenchment effect are particularly large. The following result states furthermore that the optimal ownership share reacts more negatively to (creeping) expropriation than to confiscatory taxation.

Result 7

$$\frac{d\alpha_{1/2}^*}{d\pi_{1/2}} < \frac{d\alpha_3^*}{d\pi} \tag{33}$$

Proof: See Appendix

This is due to the interaction with the optimal debt choice. The ownership share reduction is smaller in case of confiscatory taxation, where the debt level increases, than in case of (creeping) expropriation, where the debt level is reduced as a response to political risk.

4 Empirical predictions

We now turn to the predictions that can be derived from our theoretical analysis. The following predictions capture the results 4 and 6.

Hypothesis 1 *The effect of political risk on the affiliate's debt level is negative in case of (creeping) expropriation and positive in case of confiscatory taxation.*

Hypothesis 2 *The effect of political risk on the ownership share is negative in case of (creeping) expropriation and tends to be negative in case of confiscatory taxation.*

The problem of directly testing these hypotheses is that it may be difficult to identify empirically which type of political risk is present. An alternative approach would be to rank the different political risk scenarios according to their severity. It seems natural to argue that the first two scenarios of (creeping) expropriation capture a more severe type of political risk because they describe situations where political risk increases the risk of bankruptcy, whereas the third scenario describes a situation where political risk is less severe, because it affects the profitability of the investment only, without jeopardizing the survival of the affiliate and hence without imposing additional dead weight losses. Following this approach, we can state the following hypothesis.

Hypothesis 3 *The more severe the political risk, the more likely the debt level will be negatively affected.*

Similarly, we can formulate our hypothesis about the ownership share.

Hypothesis 4 *The more severe the political risk, the more likely the ownership share will be negatively affected.*

Result 6 also allows us to compare the relative reactions of leverage and ownership share to political risk. Whereas the reaction of debt is always positive in case of confiscatory taxation, this is possible for the ownership share but not necessary. From this, we derive the following prediction.

Hypothesis 5 *The ownership share is more likely to react negatively to political risk than the debt level.*

Finally, we include one prediction about the impact of taxation on the level of debt and the ownership share, based on Result 2.

Hypothesis 6 *The effect of taxation is positive on the optimal debt level and it tends to be negative on the ownership share.*

5 Data

The empirical analysis presented in section 6 is based on the Microdatabase Direct Investment (MiDi) of the Deutsche Bundesbank. The database contains a panel dataset of yearly firm-level information on German parent companies and their foreign affiliates for the period 1996-2006. The parents are required by law to report information on their investments abroad and on the financial characteristics of their foreign affiliates if the balance sheet total of the affiliate and the ownership share are larger than a certain threshold that varies over time (Lipponer (2006)).

The MiDi contains 469,332 observations with yearly observations over 11 years. As we are interested in outward FDI, we exclude all observations on inward FDI. This leaves 303,870 observations that represent affiliate-year cells. Dropping all affiliates that are present more than once in one year leaves 292,494 observations and deleting all indirect FDI leaves 208,441 observations. Deleting all firms that report negative equity removes another 21,489 observations from our dataset. Thus, the final dataset comprises 186,952 observations.

In each year, our sample consists of about 5,000 to 8,000 German parents and of about 15,000 to 24,500 foreign affiliates (compare Table 1). The affiliates are located in more than 140 countries.

We augment the MiDi dataset by country-level information. As a measure of political risk, we use the time-varying International Country Risk Guide (ICRG) index provided by the Political Risk Services (PRS) Group. The index is composed of 12 weighted variables covering both political and social attributes.[11] We recode the index in such a way that an increasing value represents higher political risk.

[11] Government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religion in politics, law and order, ethnic tensions, democratic accountability and bureaucracy quality.

There are numerous indices that try to capture the variation of political risk across countries. A good overview is provided in Howell (2008). For our analysis, the ICRG index is the best choice for three reasons: First, it takes into account diverse dimensions of political risk like corruption, bureaucratic quality, but also ethnic and religious tensions and socioeconomic conditions. Second, while many indices provide only information on a selective sample of countries, the ICRG index covers more than 140 countries. Third, the ICRG index varies according to time and provides information for all years that are covered in the MiDi dataset.

Information on GDP, GDP per capita and the rate of inflation is taken from the World Economic Outlook Database of the IMF (www.imf.org). The Private Credit variable is based on Beck, Demirgüc-Kunt, and Levine (1999). It measures the ratio of private credit lent by deposit money banks to GDP. Statutory tax rates are taken from the Institute for Fiscal Studies (www.ifs.org.uk), as well as from various issues of the Corporate Tax Guides of Ernst&Young, KPMG and PricewaterhouseCoopers.

Table 2 provides descriptive statistics of the variables used in our analysis. The definitions of the variables are standard, and they are also presented in Table 2. Comparing the descriptive statistics to those of American MNE in Desai, Foley, and Hines (2004), we find that regarding most variables used in our analysis, on average American and German MNEs tend to be quite similar. Both are active in about all countries worldwide. Consequently, the means of our country variables differ only insofar as the time period considered by Desai, Foley, and Hines (2004) is 1982 to 1994, while we analyze the year 1996-2006. In the period we analyze, both average inflation and political risk are lower. Affiliate-level variables are also quite similar for German and US-American affiliates, the sole exception being profits over total assets: while Desai, Foley, and Hines (2004) report a share of profit to assets of about 15 percent, this ratio is at only 4 percent for the German affiliates.

6 Econometric Analysis

The aim of our analysis is to investigate how the capital structure choice of multinational enterprises reacts to political risk. The two choice variables we consider are the ownership share and the level of leverage. We define the level of leverage as debt over total assets and the ownership share as the share of equity of the foreign affiliate held by the German

parent.

Leverage has a mean of 0.61 and a standard deviation of 0.31 at the firm-level. The standard deviation of average leverage per country is 0.12. The mean of the ownership share is 0.87, while its standard deviation is 0.24, and the average ownership share per country has a standard deviation of 0.14. The political risk indicator has an average value of 0.19 and a standard deviation of 0.08.

Examples of countries with extremely high political risk in our sample (an average political risk score above 0.45) are Algeria (with a political risk of 0.50), Colombia (with an average political risk of 0.47), Nigeria (with an average political risk of 0.54), Pakistan (political risk at 0.49), Yugoslavia (with an average political risk of 0.47) and Zimbabwe with a political risk of 0.51. The country with the lowest average political risk in our sample period is Luxembourg with an average political risk score of 0.07.

Figure 1 presents how the mean of the ownership share by country varies with political risk. The graph suggests a negative relationship between the ownership share and political risk even if we do not control for any other country or affiliate specific factors. When plotting leverage aggregated by country versus political risk (Figure 2), we cannot deduct any clear relationship between the two variables from the graph. In a regression analysis at the firm-level we are going to analyze the relationship more thoroughly.

All regressions presented in this paper are estimated by OLS and include parent-fixed-effects in order to control for parent-specific individual heterogeneity, and we include year and affiliate industry dummies. Thus, we aim to make use of the observed variation between affiliates of the same parent which are located in different countries as well as of the variation over time. In all regressions, we use heteroscedasticity robust standard errors, and we control for clustering of the standard errors by parent company.

In Table 3, we present the effect of political risk on both our independent variables as a first test of our hypotheses. We report each regression with and without including our statutory tax variable, because we lose many observations when including it. The choice of independent variables is similar to Desai, Foley, and Hines (2004) where the authors investigate the capital structure choice of US-American MNEs. The signs of the coefficients in our leverage regressions are equal to those presented in Desai, Foley and Hines with some minor changes.[12]

[12]The coefficient of the private credit lent by deposit money banks to GDP is negative and

On average, an increase in political risk leads to an increase in affiliate leverage and to a decrease in the ownership share the parent holds in the foreign affiliate. This seems to be consistent with our hypothesis 5 that leverage is more likely to react positively, if at all, to political risk, than to the ownership share. In the leverage regression, the coefficient of political risk of 0.1491 can be interpreted as follows: when political risk increases by one standard deviation of 0.0797, leverage increases by 0.0119 (=0.1491*0.0797), which represents 2.3 percent of its mean value. This effect is quite close to the 2.9 percent estimated by Desai, Foley, Hines (2004) for affiliates of US-American MNEs. The estimated effect of statutory taxes on the leverage share is 0.0146 (=0.2074*0.0705) which represents 2.8 percent of its mean value. Thus, the relative impact of a change of one standard deviation in political risk on leverage versus a one standard deviation change in statutory taxes is about 81 percent. The estimated effect of political risk on the ownership share is smaller. A one standard deviation increase of political risk decreases the ownership share by 1.1 percent of its mean value.

The fact that a firm's ownership and leverage choices might be related to each other can be captured by a correlation of the error terms of the two regressions. The two equations therefore form a system of seemingly unrelated regressions (Zellner (1962)). In general, it is more efficient to estimate this system of equations using feasible GLS and to allow for correlation of the error terms in the asymptotic variance matrix than to use OLS. In our case, however, there is no efficiency gain from estimating the equations jointly, because the same regressors are included in both regressions (Cameron and Trivedi (2005)). We test for correlation of the estimated residuals and we find a positive and significant correlation in the residuals of the two regressions. This implies that a positive shock on one of the two variables is also associated with an increase in the other variable.

Desai, Foley, and Hines (2004) and Desai, Foley, and Hines Jr. (2006) assume a linear effect of political risk on the capital structure choice. By contrast, according to our model the influence of political risk differs by type or strength of political risk, as noted in our hypotheses 1 to 4. To study this effect in more detail, we follow two empirical strategies. We first continue to work with the aggregated ICRG index for political risk, but include

significant at the 5 percent level in our leverage regression, while it is not significant even at the 10 percent level in their regression. The logarithm of the affiliates sales shows a significant and positive effect in our regression, while it is not significant at the 10 percent level in the leverage regression reported by Desai, Foley and Hines.

political risk squared, to allow for the the marginal effect of political risk to change with its level. This corresponds to our interpretation above, that the different scenarios or political risk can be ranked with respect to their severity, with scenario III being the less severe and scenarios I/II the more severe. Our second strategy is to use alternative disaggregated measures for political risk, with the idea to capture more specifically one particular scenario.

Table 4 presents our results for the ICRG political risk index, including political risk squared. In both regressions, the estimated marginal effect of political risk on the variable in question is positive for low levels of political risk and negative for high levels of political risk. Both results are consistent with the predictions of hypotheses 3 and 4. The big difference between leverage and the ownership share is in the level of political risk where the marginal effect changes from positive to negative: for leverage, a maximum is reached at a level of political risk of about 0.3. The vast majority (about 91 percent) of affiliates of German MNE operate in countries where the political risk is weaker than this - thus, for them, the predicted effect is positive. Only for about 9 percent of all affiliates, we predict the effect of political risk on leverage to be negative. When we model leverage as a linear function of political risk, the positive effect that we predict for the majority of affiliates of German MNEs, prevails, as seen in Table 3. For the ownership share, the change from a positive to a negative effect of political risk is predicted to take place for a much lower level of political risk (about 0.13). This is in fact consistent with our hypothesis 5.

As outlined above, as a second strategy to capture different scenarios of political risk, we try different measures of political risk. We use two measures taken from the ICRG investment risk component (contract risk and repatriation risk) and three measures from the Heritage Index (corruption, investment risk and property rights risk). Data on contract risk and repatriation risk have only been available since 2001. *Contract risk* is defined as the risk of unilateral contract modification or cancelation and, at worst, outright expropriation of foreign owned assets. *Repatriation risk* captures to what extent profits can be transferred out of the host country. Impediments include exchange controls, excessive bureaucracy and a poor banking system. *Corruption* is defined as failure of the integrity of the system. *Investment risk* measures the degree of restrictions on foreign investment, considering a country's policies towards foreign investment, as well as its policies towards internal capital flows. *Property rights risk* measures the lack of freedom to accumulate private property as

well as the risk to be expropriated.[13]

All measures have been recoded in such a way that first, higher values are associated with higher risk and, second, they lie between 0 and 1. Table 5a shows that, as in Table 3, the influence of political risk on the ownership share is negative, for all types of political risk measures considered. Interestingly, however, political risk can have either a positive or a negative influence on the level of leverage, depending on the type of risk present (Table 5b). It is positive for corruption, investment risk and property right risk. According to our interpretation, this suggests that these three types of risk reduce the profitability of the investment without significantly increasing the risk of bankruptcy. In contrast, the coefficient is negative for contract risk, which seems to affect the chances to generate revenues and hence increases the risk of bankruptcy. Surprisingly, it is also negative for repatriation risk, even though this kind of political risk is more about the use of profits, i.e., scenario 3, for which a positive coefficient is predicted. If, however, credits are taken at home, not locally, the negative coefficient would make sense, because barriers to repatriation profits would undermine the ability to repay credits.

7 Conclusion

In this paper, we have investigated how MNEs adapt their capital structure choices in the presence of political risk, both theoretically and empirically. Our analysis suggests that, when it comes to assessing the potential effects of political risk, it is important to distinguish different types of stakeholders and how these are affected by different political measures. Only then is it possible to determine the optimal reaction of the investor to this risky environment.

Almost by definition, any form of political risk negatively affects the profitability of a MNE as a whole. The investor as one of the equity holders is residual claimant of the MNE. Thus, it is not surprising that he will want to reduce his stake in the firm when political risk becomes more severe.

But, as our analysis has shown, the effects are less straightforward for debt holders. If debt holders expect debt service to become less likely, they have to adjust their interest

[13]For a more detailed description of the methodology underlying the Heritage Index see Beach and Kane (2008).

rates. The larger the additional dead weight losses, the more costly debt financing becomes and hence the more leverage is reduced. If, instead, debt service is less affected than the returns to equity holders, then debt can act as a shield against political risk and the balance shifts towards more debt finance relative to equity finance.

Why does it matter how political risk affects the multinational's choice of capital structure? Smaller ownership shares, for example, may negatively affect the governance structure of the MNE because they typically lead to smaller incentives for controlling the firm effectively. In addition, smaller ownership stakes could reduce the investor's incentive to transfer necessary technology. These effects, though not explicitly modelled here, are well known in the literature. Higher leverage, and hence higher risk of bankruptcy, on the other hand, lead to higher dead weight losses arising from inefficient bankruptcy procedures and, in this way, add to the social cost of political risk.

Thus, we would expect different kinds of inefficiencies and dead weight losses to prevail, depending on how political risk affects equity holders relative to debt holders. If ownership shares are reduced and leverage increases, one may have to face deteriorating governance structures and more inefficiencies from increased risk of bankruptcy. If instead both ownership shares and leverage are reduced, it is mostly deteriorated governance structures one has to expect.

Mathematical Appendix

Proof of Result 1

Recall that the interest rate is implicitly determined by the following break even condition for the bank:

$$\int_{(1+r)D}^{\bar{R}}(1+r)D\frac{1}{\bar{R}}dR+\int_{0}^{(1+r)D}sR\frac{1}{\bar{R}}dR=D \tag{34}$$

Solving and rearranging yields

$$\begin{aligned}\frac{1}{\bar{R}}\left[(1+r)D\bar{R}-\frac{2-s}{2}(1+r)^2D^2\right] &= D &(35)\\ \frac{1}{\bar{R}}\frac{1}{2}(1+r)^2D^2 &= \frac{(1+r)D}{2-s}-\frac{D}{2-s} &(36)\\ (2-s)(1+r)^2D &= 2r\bar{R} &(37)\end{aligned}$$

From the implicit function

$$2r\bar{R}-(2-s)(1+r)^2D=0 \tag{38}$$

we can derive how the interest rate reacts for a change in the debt level D, using the implicit function theorem.

$$\frac{dr}{dD}=-\frac{-(2-s)(1+r)^2}{2[\bar{R}-(2-s)(1+r)D]} \tag{39}$$

Using (38), this simplifies to

$$\frac{dr}{dD}=\frac{r(1+r)}{(1-r)D} \tag{40}$$

Furthermore, we can use (38) to derive how the interest rate reacts to a change in $\bar{R}$, again using the implicit function theorem.

$$\frac{dr}{d\bar{R}}=-\frac{-2r}{2[\bar{R}-(2-s)(1+r)D]} \tag{41}$$

Using (38), this simplifies to

$$\frac{dr}{d\bar{R}}=-\frac{r(1+r)}{(1-r)\bar{R}} \tag{42}$$

The investor maximizes

$$\begin{aligned}U(D,\alpha) &= V(D,\alpha)+B(\alpha)-K(\alpha) &(43)\\ &= \int_{(1+r)D}^{\bar{R}(\alpha)}(1-t)[R-(1+r)D]\frac{1}{\bar{R}(\alpha)}dR+D-I+B(\alpha)-K(\alpha) &(44)\end{aligned}$$

$$= \frac{1-t}{\bar{R}(\alpha)}\left[\frac{1}{2}\bar{R}^2(\alpha) - (1+r)D\bar{R}(\alpha) + \frac{1}{2}(1+r)^2D^2\right] + D - I + B(\alpha) - K(\alpha)$$

Using equation (34) we can rewrite the payoff function in the following way

$$U(D,\alpha) = (1-t)\left[\frac{1}{2}\bar{R}(\alpha) - \frac{(1-s)(1+r)}{2-s}D\right] + \frac{1-s+t}{2-s}D - I + B(\alpha) - K(\alpha)\ . \quad (45)$$

The investor's maximization problem is characterized by the following two first order conditions.

$$\frac{dU}{d\alpha} = (1-t)\left[\frac{1}{2}\frac{d\bar{R}}{d\alpha} - \frac{1-s}{2-s}D\frac{dr}{d\bar{R}}\frac{d\bar{R}}{d\alpha}\right] + B' - K' = 0 \quad (46)$$

$$\frac{dU}{dD} = -(1-t)\frac{1-s}{2-s}\left[(1+r) + \frac{dr}{dD}D\right] + \frac{1-s+t}{2-s} = 0 \quad (47)$$

Using (40), we can rewrite the first order condition for the optimal D in the following way

$$\frac{dU}{dD} = -(1-t)\frac{1-s}{2-s}\left[1 + r + \frac{r(1+r)}{(1-r)D}D\right] + \frac{1-s+t}{2-s} = 0 \quad (48)$$

Rearranging yields

$$\frac{1-s+t}{2-s} = (1-t)\frac{1-s}{2-s}\frac{1+r}{1-r} \quad (49)$$

We can use this condition to solve for r and $1+r$:

$$r = \frac{(2-s)t}{2(1-s)+st} \quad 1+r = \frac{2(1-s+t)}{2(1-s)+st} \quad (50)$$

Inserting this in (38), we can solve for

$$D^* = \frac{\bar{R}}{2}t\frac{2(1-s)+st}{(1-s+t)^2} \quad (51)$$

Using the solutions for r and D, we can finally determine the investor's payoff as a function of α

$$U = \frac{\bar{R}(\alpha)}{2}\frac{1-s+st}{1-s+t} - I + B(\alpha) - K(\alpha) \quad (52)$$

Q.E.D

Proof of Result 2

To see how the optimal debt level reacts to changes in t, consider the optimal debt level as

characterized by (51):

$$\frac{dD^*}{dt} = \frac{\bar{R}}{2}\left[\frac{2(1-s)+st}{(1-s+t)^2} + t\frac{(1-s+t)^2 s - (2(1-s)+st)2(1-s+t)}{(1-s+t)^4}\right] \quad (53)$$

$$= \frac{\bar{R}(1-s)^2(1-t)}{(1-s+t)^3} > 0 \quad (54)$$

To determine how the ownership ratio α reacts to changes in t, we rewrite the first order condition (46) that implicitly defines α^*, using (42) and the solution to D^* and r. After some simplification we obtain

$$(1-t)\left[1 + \frac{t^2}{(1-s+t)(1-t)}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha} + B' - K' = 0 \quad (55)$$

$$\left[\frac{1-s+st}{1-s+t}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha} + B' - K' = 0 \quad (56)$$

From this we find, using the implicit function theorem

$$\frac{d\alpha^*}{dt} = -\frac{\left[\frac{(1-s+t)s-(1-s+st)}{(1-s+t)^2}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha}}{\left[\frac{1-s+st}{(1-s+t)}\right]\frac{1}{2}\frac{d^2\bar{R}}{d\alpha^2} + B'' - K''} \quad (57)$$

$$(58)$$

$$= \frac{\left[\frac{(1-s)^2}{(1-s+t)^2}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha}}{\underbrace{\left[\frac{1-s+st}{1-s+t}\right]}_{+}\frac{1}{2}\underbrace{\frac{d^2\bar{R}}{d\alpha^2}}_{-} + \underbrace{B''}_{-} - \underbrace{K''}_{+}} \quad (59)$$

Note that the sign of $\frac{d\alpha}{dt}$ depends on the sign of $\frac{d\bar{R}}{d\alpha}$. Using equation (56), we find that $R' > 0$ if $B' < K'$ in the relevant parameter range, and hence $\frac{d\alpha}{dt} < 0$ if $B' < K'$.

Q.E.D.

Proof of Result 3

Consider first the case of expropriation. Recall that the interest rate is implicitly determined by the following break even condition for the bank:

$$(1-\pi_1)\left[\int_{(1+r)D}^{\bar{R}}(1+r)D\frac{1}{\bar{R}}dR + \int_0^{(1+r)D} sR\frac{1}{\bar{R}}dR\right] = D \quad (60)$$

Solving and rearranging yields

$$\begin{aligned}
\frac{1-\pi_1}{\bar{R}}\left[(1+r)D\bar{R}-\frac{2-s}{2}(1+r)^2D^2\right] &= D && (61)\\
\frac{1-\pi_1}{\bar{R}}\frac{1}{2}(1+r)^2D^2 &= \frac{(1-\pi_1)(1+r)D}{2-s}-\frac{D}{2-s} && (62)\\
(1-\pi_1)(2-s)(1+r)^2D &= 2(1-\pi_1)(1+r)\bar{R}-2\bar{R} && (63)
\end{aligned}$$

From the implicit function

$$2[(1-\pi_1)(1+r)-1]\bar{R}-(1-\pi_1)(2-s)(1+r)^2D=0 \tag{64}$$

we can derive how the interest rate reacts to a change in the debt level D

$$\frac{dr}{dD}=-\frac{-(1-\pi_1)(2-s)(1+r)^2}{2[(1-\pi_1)\bar{R}-(1-\pi_1)(2-s)(1+r)D]} \tag{65}$$

Using (64), this simplifies to

$$\frac{dr}{dD}=\frac{(1+r)[(1-\pi_1)(1+r)-1]}{[2-(1-\pi_1)(1-r)]D} \tag{66}$$

Furthermore, we can derive how the interest rate reacts to a change in $\bar{R}$

$$\frac{dr}{d\bar{R}}=-\frac{2[(1-\pi_1)(1+r)-1]}{2(1-\pi_1)\bar{R}-2(1-\pi_1)(2-s)(1+r)D} \tag{67}$$

Using again (64), this simplifies to

$$\frac{dr}{\bar{R}}=-\frac{2[(1-\pi_1)(1+r)-1](1+r)}{2-(1-\pi_1)(1+r)\bar{R}}>0 \tag{68}$$

The investor maximizes

$$\begin{aligned}
U_1(D,\alpha) &= (1-\pi_1)\int_{(1+r)D}^{\bar{R}(\alpha)}(1-t)[R-(1+r)D]\frac{1}{\bar{R}(\alpha)}dR+D-I+(1-\pi_1)B(\alpha)-K(\alpha) && (69)\\
&= \frac{(1-\pi_1)(1-t)}{\bar{R}(\alpha)}\left[\frac{1}{2}\bar{R}^2(\alpha)-(1+r)D\bar{R}(\alpha)+\frac{1}{2}(1+r)^2D^2\right]+D-I+(1-\pi_1)B(\alpha)-K(\alpha)
\end{aligned}$$

Using equation (60) we can rewrite the payoff function in the following way

$$U_1(D,\alpha) = (1-\pi_1)(1-t)\left[\frac{1}{2}\bar{R}(\alpha) - \frac{(1-s)(1+r)}{2-s}D\right] + \frac{1-s+t}{2-s}D - I + (1-\pi_1)B(\alpha) - K(\alpha)\,. \tag{70}$$

The investor's maximization problem is characterized by the following two first order conditions.

$$\frac{dU_1}{d\alpha} = (1-\pi_1)(1-t)\left[\frac{1}{2}\frac{d\bar{R}}{d\alpha} - \frac{1-s}{2-s}D\frac{dr}{d\bar{R}}\frac{d\bar{R}}{d\alpha}\right] + (1-\pi_1)B' - K' = 0 \tag{71}$$

$$\frac{dU_1}{dD} = -(1-\pi_1)(1-t)\frac{1-s}{2-s}\left[(1+r) + \frac{dr}{dD}D\right] + \frac{1-s+t}{2-s} = 0 \tag{72}$$

Using (66), we can rewrite the first order condition for the optimal D in the following way

$$\frac{dU_1}{dD} = -(1-\pi)(1-t)\frac{1-s}{2-s}\left[1 + r + \frac{(1+r)[(1-\pi_1)(1+r)-1]}{[2-(1-\pi_1)(1+r)D}D\right] + \frac{1-s+t}{2-s} = 0 \tag{73}$$

Rearranging yields

$$\frac{1-s+t}{2-s} = (1-\pi_1)(1-t)\frac{1-s}{2-s}\frac{1+r}{2-(1-\pi_1)(1+r)} \tag{74}$$

We can use this condition to solve for r and $1+r$:

$$r_1 = \frac{(2-s)t}{(1-\pi_1)[2(1-s)+st]} \quad 1+r_1 = \frac{2(1-s+t)}{(1-\pi_1)[2(1-s)+st]} \tag{75}$$

Inserting this in (64), we can solve for

$$D_1^* = (1-\pi_1)\frac{\bar{R}}{2}t\frac{2(1-s)+st}{(1-s+t)^2} \tag{76}$$

Using the solutions for r and D_1, we can finally determine the investor's payoff

$$U_1 = (1-\pi_1)\left[\frac{\bar{R}}{2}\frac{1-s+st}{1-s+t} + B(\alpha)\right] - K(\alpha) - I \tag{77}$$

Creeping expropriation

Consider now the case of creeping expropriation. Recall that the interest rate is implicitly

determined by the following break even condition for the bank:

$$\left[\int_{\frac{(1+r)D}{(1-\pi_2)}}^{\bar{R}}(1+r)D\frac{1}{\bar{R}}dR+\int_0^{\frac{(1+r)D}{(1-\pi_2)}}s(1-\pi_2)R\frac{1}{\bar{R}}dR\right]=D \tag{78}$$

Solving and rearranging yields

$$\begin{aligned}\frac{1}{(1-\pi_2)\bar{R}}\left[(1+r)D(1-\pi_2)\bar{R}-\frac{2-s}{2}(1+r)^2D^2\right] &= D &(79)\\ \frac{1}{(1-\pi_2)\bar{R}}\frac{1}{2}(1+r)^2D^2 &= \frac{(1+r)D}{2-s}-\frac{D}{2-s} &(80)\\ (2-s)(1+r)^2D &= 2(1-\pi_2)(1+r)\bar{R}-2(1-\pi_2)\bar{R}\\ (2-s)(1+r)^2D &= 2r(1-\pi_2)\bar{R} &(81)\end{aligned}$$

From the implicit function

$$2r(1-\pi_2)\bar{R}-(2-s)(1+r)^2D=0 \tag{82}$$

we can derive how the interest rate reacts for a change in the debt level D

$$\frac{dr}{dD}=-\frac{-(2-s)(1+r)^2}{2[(1-\pi_2)\bar{R}-(2-s)(1+r)D]} \tag{83}$$

Using (82), this simplifies to

$$\frac{dr}{dD}=\frac{r(1+r)}{(1-r)D} \tag{84}$$

Furthermore, we can derive how the interest rate reacts to a change in $\bar{R}$

$$\frac{dr}{d\bar{R}}=-\frac{2r(1-\pi_2)}{2(1-\pi_2)\bar{R}-2(2-s)(1+r)D} \tag{85}$$

Using again (82), this simplifies to

$$\frac{dr}{\bar{R}}=-\frac{r(1+r)}{(1+r)\bar{R}}>0 \tag{86}$$

The investor maximizes

$$U_2(D,\alpha) = \int_{\frac{(1+r)D}{(1-\pi_2)}}^{\bar{R}(\alpha)}(1-t)[(1-\pi_2)R-(1+r)D]\frac{1}{\bar{R}(\alpha)}dR+D-I+(1-\pi_2)B(\alpha)-K(\alpha)$$

$$= \frac{(1-t)}{(1-\pi_2)\bar{R}(\alpha)}\left[\frac{1}{2}(1-\pi_2)^2\bar{R}^2(\alpha) - (1+r)D(1-\pi_2)\bar{R}(\alpha) + \frac{1}{2}(1+r)^2D^2\right] \quad (87)$$

$$+D - I + (1-\pi_2)B(\alpha) - K(\alpha) \quad (88)$$

Using equation (82) we can rewrite the payoff function in the following way

$$U_2(D,\alpha) = (1-t)\left[\frac{1}{2}(1-\pi_2)\bar{R}(\alpha) - \frac{(1-s)(1+r)}{2-s}D\right] + \frac{1-s+t}{2-s}D - I + (1-\pi_2)B(\alpha) - K(\alpha)\,. \quad (89)$$

The investor's maximization problem is characterized by the following two first order conditions.

$$\frac{dU}{d\alpha} = (1-t)\left[\frac{1}{2}(1-\pi_2)\frac{d\bar{R}}{d\alpha} - \frac{1-s}{2-s}D\frac{dr}{d\bar{R}}\frac{d\bar{R}}{d\alpha}\right] + (1-\pi_2)B' - K' = 0 \quad (90)$$

$$\frac{dU}{dD} = -(1-t)\frac{1-s}{2-s}\left[(1+r) + \frac{dr}{dD}D\right] + \frac{1-s+t}{2-s} = 0 \quad (91)$$

Using (84), we can rewrite the first order condition for the optimal D in the following way

$$\frac{dU}{dD} = -(1-\pi)(1-t)\frac{1-s}{2-s}\left[1 + r + \frac{r(1+r)}{(1-r)D}D\right] + \frac{1-s+t}{2-s} = 0 \quad (92)$$

Rearranging yields

$$\frac{1-s+t}{2-s} = (1-t)\frac{1-s}{2-s}\frac{1+r}{(1-r)} \quad (93)$$

We can use this condition to solve for r_2 and $1+r_2$:

$$r_2 = \frac{(2-s)t}{2(1-s)+st} \quad 1+r_2 = \frac{2(1-s+t)}{2(1-s)+st} \quad (94)$$

Inserting this in (82), we can solve for

$$D_2 = (1-\pi_2)\frac{\bar{R}}{2}t\frac{2(1-s)+st}{(1-s+t)^2} = D_1 \quad (95)$$

Using the solutions for r_2 and D_2, we can finally determine the investor's payoff

$$U_2 = (1-\pi_2)\left[\frac{\bar{R}}{2}\frac{1-s+st}{1-s+t} + B(\alpha)\right] - K(\alpha) - I \quad (96)$$

Q.E.D.

Proof of Result 4

In Result 3 we have seen that the optimal debt levels and the investor's payoff are the same in both cases, expropriation and creeping expropriation. We now determine the comparative statics with respect to the local taxation rate $\pi_{1/2}$.

To see how the optimal debt level reacts to changes in π_1, consider the optimal debt level as characterized in (76) and (95).

$$\frac{dD^*_{1/2}}{d\pi_{1/2}} = -\frac{1}{2}\bar{R}t\frac{(2(1-s)+st)}{(1-s+t)^2} < 0 \tag{97}$$

To determine how the ownership ratio α reacts to changes in $\pi_{1/2}$, we use the first order condition of (77) or (96) that implicitly defines α^*

$$(1-\pi_{1/2})\left[\left[\frac{1-s+st}{1-s+t}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha}+B'\right]-K' = 0 \tag{98}$$

From this we find, using the implicit function theorem

$$\frac{d\alpha^*}{d\pi_{1/2}} = -\frac{\overbrace{-\frac{(1-s+st)}{(1-s+t)}\frac{1}{2}\frac{d\bar{R}}{d\alpha}-B'}^{-}}{(1-\pi_{1/2}\underbrace{\frac{1-s+st}{(1-s+t)}\frac{1}{2}\frac{d^2\bar{R}}{d\alpha^2}}_{-}+(1-\pi_{1/2})\underbrace{B''}_{-}-\underbrace{K''}_{+}} < 0 \tag{99}$$

where the negative sign of the nominator is due to the fact that the first order condition (98) needs to be satisfied.

Q.E.D.

Proof of Result 5

Recall that in case of confiscatory taxation the interest rate is implicitly determined by the same break even condition for the bank as in the base line model:

$$\int_{(1+r)D}^{\bar{R}}(1+r)D\frac{1}{\bar{R}}dR+\int_0^{(1+r)D}sR\frac{1}{\bar{R}}dR = D \tag{100}$$

This implies the same implicit function and hence the same conditions for the interest rate as above.

$$2r\bar{R}-(2-s)(1+r)^2D = 0 \tag{101}$$

$$\frac{dr}{dD} = \frac{r(1+r)}{(1-r)D} \tag{102}$$

and

$$\frac{dr}{d\bar{R}} = -\frac{r(1+r)}{(1-r)\bar{R}} \tag{103}$$

The investor maximizes

$$\begin{aligned} U_3(D,\alpha) &= \int_{(1+r)D}^{\bar{R}(\alpha)} (1-t-\pi_3)[R-(1+r)D]\frac{1}{\bar{R}(\alpha)}dR + D - I + B(\alpha) - K(\alpha) \qquad (104) \\ &= \frac{1-t-\pi_3}{\bar{R}(\alpha)}\left[\frac{1}{2}\bar{R}^2(\alpha) - (1+r)D\bar{R}(\alpha) + \frac{1}{2}(1+r)^2D^2\right] + D - I + B(\alpha) - K(\alpha) \end{aligned}$$

Using equation (101) we can rewrite the payoff function in the following way

$$U_3(D,\alpha) = (1-t-\pi_3)\left[\frac{1}{2}\bar{R}^2(\alpha) - \frac{(1-s)(1+r)}{2-s}D\right] + \frac{1-s+t+\pi_3}{2-s}D - I + B(\alpha) - K(\alpha)\ . \tag{105}$$

The investor's maximization problem is characterized by the following two first order conditions.

$$\begin{aligned} \frac{dU_3}{d\alpha} &= (1-t-\pi_3)\left[\frac{1}{2}\frac{d\bar{R}}{d\alpha} - \frac{1-s}{2-s}D\frac{dr}{d\bar{R}}\frac{d\bar{R}}{d\alpha}\right] + B' - K' = 0 \qquad (106) \\ \frac{dU_3}{dD} &= -(1-t-\pi_3)\frac{1-s}{2-s}\left[(1+r) + \frac{dr}{dD}D\right] + \frac{1-s+t+\pi_3}{2-s} = 0 \qquad (107) \end{aligned}$$

Using (102), we can rewrite the first order condition for the optimal D in the following way

$$\frac{dU_3}{dD} = -(1-t-\pi_3)\frac{1-s}{2-s}\left[1+r+\frac{r(1+r)}{(1-r)D}D\right] + \frac{1-s+t+\pi_3}{2-s} = 0 \tag{108}$$

Rearranging yields

$$\frac{1-s+t+\pi_3}{2-s} = (1-t-\pi_3)\frac{1-s}{2-s}\frac{1+r}{1-r} \tag{109}$$

We can use this condition to solve for r_3 and $1+r_3$:

$$r_3 = \frac{(2-s)(t+\pi_3)}{2(1-s)+s(t+\pi_3)} \quad 1+r_3 = \frac{2(1-s+t+\pi_3)}{2(1-s)+s(t+\pi_3)} \tag{110}$$

Inserting this in (101), we can solve for

$$D_3^* = \frac{\bar{R}}{2}(t+\pi_3)\frac{2(1-s)+s(t+\pi_3)}{(1-s+t+\pi_3)^2} \tag{111}$$

Using the solutions for r_3 and D_3, we can finally determine the investor's payoff

$$U_3 = \frac{\bar{R}}{2}\frac{1-s+s(t+\pi_3)}{1-s+t+\pi_3} - I + (1-\pi_3)B(\alpha) - K(\alpha) \tag{112}$$

Q.E.D.

Proof of Result 6

To see how the optimal debt level reacts to changes in π_3, consider the optimal debt level as characterized by (111):

$$\begin{aligned}\frac{dD_3^*}{d\pi_3} &= \frac{\bar{R}}{2}\left[\frac{2(1-s)+s(t+\pi_3)}{(1-s+t+\pi_3)^2} + (t+\pi_3)\frac{(1-s+t+\pi_3)^2 s - 2(2(1-s)+s(t+\pi_3))(1-s+t+\pi_3)}{(1-s+t+\pi_3)^4}\right] \\ &= \frac{\bar{R}(1-s)^2}{(1-s+t+\pi_3)^3} > 0 \end{aligned} \tag{113}$$

To determine how the ownership ratio α reacts to changes in t, consider the first order condition of (112) that implicitly defines α_3^*.

$$\left[\frac{1-s+s(t+\pi_3)}{1-s+t+\pi_3}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha} + (1-\pi_3)B' - K' = 0 \tag{114}$$

From this we find, using the implicit function theorem,

$$\frac{d\alpha_3^*}{d\pi_3} = -\frac{\left[-\frac{(1-s)^2}{(1-s+t+\pi_3)^2}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha}}{\underbrace{\left[\frac{1-s+s(t+\pi_3)}{1-s+t+\pi_3}\right]}_{+}\frac{1}{2}\underbrace{\frac{d^2\bar{R}}{d\alpha^2}}_{-} + (1-\pi_3)\underbrace{B''}_{-} - \underbrace{K''}_{+}} \tag{115}$$

Note that the sign of $\frac{d\alpha_3}{d\pi_3}$ depends on the sign of $\frac{d\bar{R}}{d\alpha}$. Using equation (114), we find that $R' > 0$ if $B' < K'$ in the relevant parameter range, and hence $\frac{d\alpha_3}{d\pi_3} < 0$ if $B' < K'$.

Q.E.D.

Proof of Result 7

Consider

$$\frac{d\alpha_{1/2}^*}{d\pi_{1/2}} = \frac{\frac{(1-s+st)}{(1-s+t)}\frac{1}{2}\frac{d\bar{R}}{d\alpha} + B'}{(1-\pi_{1/2})\left[\frac{1-s+st}{(1-s+t)}\frac{1}{2}\frac{d^2\bar{R}}{d\alpha^2} + B''\right] - K''} < 0 \tag{116}$$

and

$$\frac{d\alpha_3^*}{d\pi_3} = \frac{\left[\frac{(1-s)^2}{(1-s+t+\pi_3)^2}\right]\frac{1}{2}\frac{d\bar{R}}{d\alpha}}{\left[\frac{1-s+s(t+\pi_3)}{1-s+t+\pi_3}\right]\frac{1}{2}\frac{d^2\bar{R}}{d\alpha^2}+B''-K''} < 0 \text{ if } \bar{R}' > 0 \quad (117)$$

To see that $\frac{d\alpha_{1/2}}{d\pi_{1/2}} < \frac{d\alpha_3}{d\pi_3}$ it is sufficient to show that nominator of $\left|\frac{d\alpha_{1/2}}{d\pi_{1/2}}\right|$ is larger than the nominator of $\left|\frac{d\alpha_3}{d\pi_3}\right|$ and the denominator is smaller than the respective denominator. Simple rearranging of the respective equations prove that this is indeed the case. *Q.E.D.*

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Figure 1: The Relationship between Political Risk and Ownership Share, 1996-2006

Figure 2: The Relationship between Political Risk and Leverage Level, 1996-2006

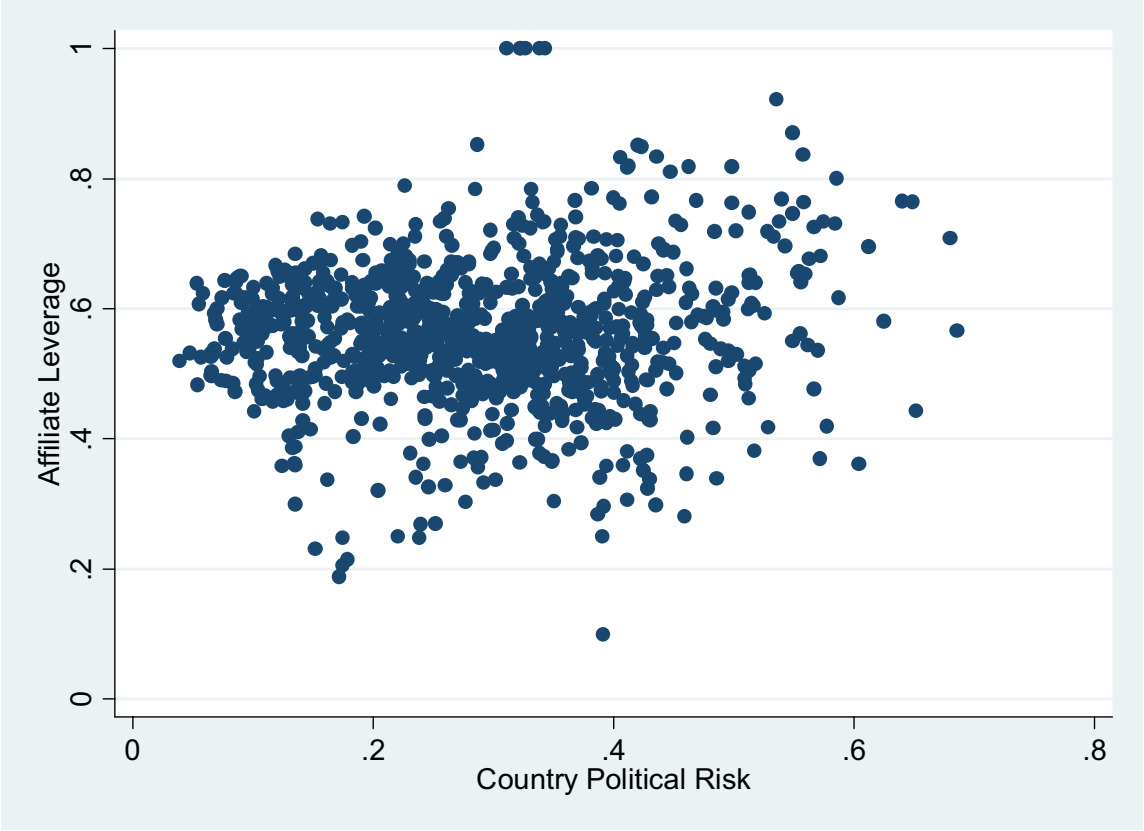

Table 1

Overview of the number of parent companies and affiliates per year

Year	Number of parent companies	Number of affiliates
1996	6,965	17,038
1997	7,277	18,034
1998	7,617	19,108
1999	7,567	19,422
2000	7,963	20,874
2001	8,080	21,509
2002	5,358	13,893
2003	5,178	13,706
2004	5,095	13,945
2005	5,119	14,438
2006	5,124	14,985

Table 2
Descriptive Statistics

	Definition	Mean	Std. deviation	Min*	Max*
Dependent Variables					
Leverage	Debt/ Total Capital	0.5081	0.2951	0.0000	1.0011
Ownership Share	Share of affiliate's equity held by German mother	0.7716	0.3495	0.0100	1.0000
Independent Variables (firm-level)					
Fixed/ Total Assets		0.2426	0.2696	0.0000	1.0000
Log(Sales)		9.1944	1.4369	6.9078	17.4813
Profit/ Total Assets		0.0422	0.1746	-6.6521	7.9427
Independent Variables (country-level)					
Inflation		0.4180	1.4610	-1.0000	106.1200
Log(GDP)		6.1203	1.5898	-1.2040	9.4876
Log(GDP per Capita)		9.6539	1.0605	4.4634	11.4067
Political Risk	Index between zero and one with a higher index reflecting higher political risk	0.1903	0.0797	0.0392	0.7479
Private Credit	Ratio of private credit lent by deposit money banks to total GDP	0.8144	0.4090	0.0130	2.1785
Statutory Tax		0.3290	0.0705	0.0000	0.5300

*Averaged over three affiliates

Table 3
The Impact of Political Risk on Affiliate Leverage and Ownership Share

	(1)	(2)	(3)	(4)
Dependent Variable	Leverage	Leverage	Ownership	Ownership
Political Risk	0.1172**	0.1491**	-0.1381**	-0.1100**
	(8.11)	(9.04)	(11.41)	(8.25)
Log(Sales)	0.0113**	0.0118**	-0.0059**	-0.0052**
	(14.70)	(14.35)	(9.02)	(7.44)
Profit/ Total Assets	-0.4228**	-0.4058**	-0.0129**	-0.0091*
	(31.84)	(29.18)	(3.32)	(2.26)
Fixed/ Total Assets	-0.0335**	-0.0213**	-0.0232**	-0.0285**
	(7.15)	(4.29)	(6.57)	(7.60)
Private Credit	-0.0289**	-0.0311**	-0.0297**	-0.0298**
	(15.26)	(15.77)	(19.05)	(18.42)
Inflation	-0.0008	-0.0049**	-0.0002	0.0015
	-1.44	(3.43)	(-0.54)	(-1.25)
Log(GDP)	0.0023**	-0.0006	-0.0043**	-0.0016*
	(3.40)	-0.71	(7.69)	(2.39)
Log(GDP per capita)	0.0051**	0.0039*	0.0254**	0.026**
	(3.71)	(2.43)	(20.03)	(18.49)
Statutory Tax		0.2074**		-0.1429**
		(14.82)		(13.26)
Constant	0.3120	0.2526**	0.7429	0.7382**
	(12.27)**	(8.89)	(34.80)**	(31.45)
Observations	142325	127096	142309	127084
Number of Mothers	11666	11315	11666	11315
R-squared	0.11	0.12	0.04	0.04

OLS regression including mother fixed effects
Year and affiliate industry dummies included
Heteroscedasticity robust standard errors in parentheses
Clustering of standard errors by parent company
*** p<0.01, ** p<0.05, * p<0.1

Data sources: Firm-level variables are taken from the Microdatabase Direct Investment of the Deutsche Bundesbank. Private Credit is provided in Beck et al. (1999). Inflation, Log of GDP, Log of GDP per capita are taken from the IMF. Statutory Tax rates are taken from the IFS, as well as from the Corporate Tax Guides of Ernst&Young, KPMG and Pricewaterhouse Coopers .

Table 4
The Impact of Political Risk on Affiliate Leverage and Ownership Share
(Allowing for a non-linear impact)

Dependent Variable	(1) Leverage	(2) Leverage	(3) Ownership	(4) Ownership
Political Risk	0.4924**	0.5616**	0.1667**	0.1733**
	(14.75)	(15.35)	(6.11)	(5.77)
Political Risk Squared	-0.7828**	-0.9387**	-0.6359**	-0.6445**
	(12.23)	(12.30)	(11.51)	(9.72)
Log(Sales)	0.0112**	0.0116**	-0.006**	-0.0053**
	(14.54)	(14.14)	(9.18)	(7.60)
Profit/ Total Assets	-0.4219**	-0.4048**	-0.0121**	-0.0084*
	(31.85)	(29.18)	(3.13)	(2.09)
Fixed/ Total Assets	-0.0328**	-0.0211**	-0.0227**	-0.0283**
	(7.02)	(4.24)	(6.43)	(7.57)
Private Credit	-0.0258**	-0.0264**	-0.0272**	-0.0265**
	(13.55)	(13.19)	(17.24)	(16.00)
Inflation	0.0003	0.0005	0.0007	0.0052**
	-0.56	-0.3	-1.56	(4.01)
Log(GDP)	0.0019**	-0.0006	-0.0046**	-0.0016*
	(2.89)	-0.82	(8.20)	(2.47)
Log(GDP per Capita)	0.0039**	0.0011	0.0244**	0.0241**
	(2.81)	-0.68	(19.13)	(16.86)
Statutory Tax		0.2078**		-0.1426**
		(14.86)		(13.25)
Constant	0.2831**	0.233**	0.7194**	0.7247**
	(11.08)	(8.19)	(33.77)	(30.91)
Observations	142325	127096	142309	127084
Number of Mothers	11666	11315	11666	11315
R-squared	0.12	0.12	0.04	0.04

OLS regression including mother fixed effects
Year and affiliate industry dummies included
Heteroscedasticity robust standard errors in parentheses
Clustering of standard errors by parent company
*** p<0.01, ** p<0.05, * p<0.1

Data sources: Firm-level variables are taken from the Microdatabase Direct Investment of the Deutsche Bundesbank. Private Credit is provided in Beck et al. (1999). Inflation, Log of GDP, Log of GDP per capita are taken from the IMF. Statutory Tax rates are taken from the IFS, as well as from the Corporate Tax Guides of Ernst&Young, KPMG and Pricewaterhouse Coopers .

Table 5 a
The Impact of Political Risk (Different Measures) on Ownership Share

	(1) Ownership	(2) Ownership	(3) Ownership	(4) Owernship	(5) Ownerhship	(6) Ownership	(7) Ownership	(8) Ownerhship	(9) Ownership	(10) Ownership
Contract Risk	-0.096	-0.101								
	(8.45)**	(7.69)**								
Corruption			-0.0328	-0.0275						
			(6.95)**	(5.32)**						
Investment Risk					-0.0436	-0.0437				
					(8.11)**	(7.40)**				
Property Rights Risk							-0.033	-0.0398		
							(5.34)**	(5.64)**		
Repatriation Risk									-0.0051	-0.0292
									-0.55	(2.50)*
Log(Sales)	-0.0052	-0.0049	-0.0059	-0.0051	-0.006	-0.0052	-0.006	-0.0052	-0.0049	-0.0046
	(5.41)**	(4.66)**	(9.00)**	(7.34)**	(9.16)**	(7.45)**	(9.15)**	(7.49)**	(5.07)**	(4.36)**
Profit/ Total Assets	-0.0103	-0.01	-0.0126	-0.009	-0.012	-0.0087	-0.0123	-0.0088	-0.0108	-0.0104
	-1.6	-1.51	(3.27)**	(2.24)*	(3.11)**	(2.15)*	(3.19)**	(2.19)*	-1.69	-1.58
Fixed/ Total Assets	-0.0217	-0.0253	-0.0213	-0.027	-0.0209	-0.0269	-0.0215	-0.0277	-0.0206	-0.0248
	(4.21)**	(4.66)**	(6.04)**	(7.24)**	(5.92)**	(7.20)**	(6.09)**	(7.39)**	(4.00)**	(4.56)**
Private Credit	-0.0266	-0.0278	-0.0305	-0.0313	-0.0271	-0.0284	-0.0284	-0.0298	-0.029	-0.0309
	(10.76)**	(10.78)**	(18.39)**	(18.11)**	(17.49)**	(17.66)**	(18.00)**	(18.30)**	(11.79)**	(12.17)**
Inflation	0.0006	-0.0018	-0.0007	0	-0.001	-0.0007	-0.0009	-0.0002	-0.0042	-0.0061
	-0.28	-0.72	-1.7	-0.01	(2.09)*	-0.56	-1.94	-0.16	-1.96	(2.57)*
Log(GDP)	-0.0045	-0.003	-0.0054	-0.0027	-0.0045	-0.0016	-0.0055	-0.0025	-0.0049	-0.0024
	(5.93)**	(3.17)**	(10.04)**	(4.23)**	(8.07)**	(2.48)*	(10.24)**	(3.93)**	(6.19)**	(2.50)*
Log(GDP per capita)	0.0224	0.0222	0.0299	0.0293	0.0314	0.0303	0.0304	0.0281	0.0276	0.0254
	(14.66)**	(13.19)**	(25.54)**	(22.00)**	(31.42)**	(27.47)**	(24.08)**	(19.33)**	(16.32)**	(13.36)**
Statutory Tax		-0.1183		-0.1394		-0.1481		-0.1416		-0.1335
		(7.43)**		(12.75)**		(13.84)**		(13.03)**		(8.50)**
Constant	0.7591	0.7535	0.683	0.6932	0.6669	0.6861	0.678	0.7083	0.7049	0.7236
	(25.72)**	(22.97)**	(33.40)**	(30.62)**	(34.59)**	(32.17)**	(32.20)**	(30.14)**	(23.25)**	(21.31)**
Observations	73320	66286	142793	127403	142793	127403	142793	127403	73320	66286
Number of Mothers	8646	8447	11691	11332	11691	11332	11691	11332	8646	8447
Years	2001-2006	2001-2006	1996-2006	1996-2006	1996-2006	1996-2006	1996-2006	1996-2006	2001-2006	2001-2006
R-squared	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04

Data sources: Corruption, Investment Risk, Property Rights Risk taken from the Heritage Foundation. Contract Risk and Repatriation Risk provided by PRS. All other variables see Tables 3, 4.

Table 5b
The Impact of Political Risk (Different Measures) on Affiliate Leverage

	(1) Leverage	(2) Leverage	(3) Leverage	(4) Leverage	(5) Leverage	(6) Leverage	(7) Leverage	(8) Leverage	(9) Leverage	(10) Leverage
Contract Risk	-0.0400	-0.0696								
	(2.94)**	(4.36)**								
Corruption			0.0804	0.0893						
			(14.41)**	(14.47)**						
Investment Risk					0.0042	0.0277				
					-0.66	(3.82)**				
Property Rights Risk							0.0634	0.0814		
							(8.87)**	(9.88)**		
Repatriation Risk									-0.0507	-0.0428
									(4.58)**	(3.09)**
Log(Sales)	0.0128	0.0126	0.0112	0.0117	0.0112	0.0118	0.0114	0.0119	0.0128	0.0127
	(11.73)**	(10.71)**	(14.52)**	(14.19)**	(14.60)**	(14.30)**	(14.76)**	(14.46)**	(11.74)**	(10.82)**
Profit/ Total Assets	-0.4143	-0.3919	-0.422	-0.4054	-0.4232	-0.4065	-0.4229	-0.4062	-0.4144	-0.3921
	(21.07)**	(19.04)**	(31.93)**	(29.22)**	(31.93)**	(29.25)**	(31.95)**	(29.25)**	(21.07)**	(19.04)**
Fixed/ Total Assets	-0.0102	-0.0017	-0.0349	-0.0224	-0.0367	-0.0242	-0.0349	-0.022	-0.0101	-0.0014
	-1.52	-0.24	(7.50)**	(4.55)**	(7.88)**	(4.91)**	(7.48)**	(4.43)**	-1.5	-0.2
Private Credit	-0.028	-0.0297	-0.0218	-0.0231	-0.0308	-0.0326	-0.0278	-0.0296	-0.0285	-0.0314
	(9.11)**	(9.22)**	(11.05)**	(11.18)**	(16.40)**	(16.62)**	(14.55)**	(14.85)**	(9.35)**	(9.88)**
Inflation	0.0044	0.0064	-0.0003	-0.0026	-0.0002	-0.0025	-0.0001	-0.0024	0.0042	0.0042
	-1.78	(2.39)*	-0.63	-1.88	-0.37	-1.77	-0.11	-1.69	-1.79	-1.62
Log(GDP)	0.0061	0.0036	0.0028	0.0011	0.0039	0.0005	0.0033	0.0008	0.0069	0.0044
	(6.67)**	(3.23)**	(4.33)**	-1.4	(5.79)**	-0.65	(5.08)**	-0.98	(7.31)**	(3.83)**
Log(GDP per Capita)	-0.006	-0.0103	0.0086	0.0069	-0.0026	-0.0044	0.0052	0.0044	-0.0087	-0.0103
	(3.60)**	(5.54)**	(6.84)**	(4.75)**	(2.42)*	(3.64)**	(3.91)**	(2.83)**	(4.70)**	(4.89)**
Statutory Tax		0.2012		0.1813		0.2175		0.1999		0.19
		(9.84)**		(12.76)**		(15.64)**		(14.26)**		(9.39)**
Constant	0.33	0.3161	0.2757	0.2276	0.4033	0.3474	0.3137	0.2497	0.3544	0.3159
	(8.51)**	(6.99)**	(11.37)**	(8.44)**	(17.40)**	(13.40)**	(12.61)**	(8.88)**	(9.03)**	(6.85)**
Observations	73332	66296	142809	127415	142809	127415	142809	127415	73332	66296
Number of Mothers	8646	8447	11691	11332	11691	11332	11691	11332	8646	8447
Years	2001-2006	2001-2006	1996-2006	1996-2006	1996-2006	1996-2006	1996-2006	1996-2006	2001-2006	2001-2006
R-squared	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12

Data sources: Corruption, Investment Risk, Property Rights Risk taken from the Heritage Foundation. Contract Risk and Repatriation Risk provided by PRS. All other variables see Tables 3, 4.

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